



Appendix 10.1

Health Impact Assessment (July 2022)

Appendix 10.1: Health Impact Assessment

1 Introduction

- 1.1 This Health Impact Assessment (HIA) has been prepared by the Savills Health and Social Impact Assessment team within the Environment & Infrastructure department, on behalf of Biomass UK No.2 Limited, regarding the Barry Biomass Facility (hereafter referred to as the 'Development').
- 1.2 HIA is designed to identify and assess the potential health outcomes (both adverse and beneficial) of a proposed project, plan or programme and to deliver evidence-based recommendations that maximise health gains and reduce or remove potential negative impacts on health and wellbeing.
- 1.3 In this instance, the purpose of this HIA is to investigate address and assess potential health risk to the host community directly attributable to what is proposed.
- 1.4 The remainder of this HIA is structured as follows:
- Section 2: Legislation, Planning Policy and Guidance;
 - Section 3: Assessment Methodology;
 - Section 4: Project Profile;
 - Section 5: Baseline;
 - Section 6: Assessment of Construction Effects;
 - Section 7: Assessment of Operation Effects;
 - Section 8: Risk Perception;
 - Section 9: Cumulative Effects; and
 - Section 10: Conclusions.

2 Legislation, Planning Policy and Guidance

- 2.1 Health is an overlapping theme that spans across a range of legislative requirements and policy expectations. The following entries are those most pertinent to the application geared towards the protection and promotion of health.

Relevant Legislation

- 2.2 The Well-being of Future Generations (Wales) Act (2015)¹ sets seven well-being goals geared towards improving the social, economic, environmental and cultural well-being of Wales. In this context, the Act places a Public Sector Duty that extends to wider policy and planning to support the delivery of the objectives, namely, a prosperous, resilient, healthier, more equal, more cohesive, vibrant and globally responsible Wales.

Planning Policy Context – Wales

- 2.3 Planning Policy Wales (PPW 2021)² sets out the land use planning policies of the Welsh Government, of which in combination with the Technical Advice Notes (TANs) provide the national planning policy framework for Wales.
- 2.4 The primary function of PPW is to ensure that the planning system contributes towards the delivery of sustainable development, and improves the social, economic, environmental and cultural well-being of Wales (as per Well-being of Future Generations (Wales) Act 2015).

Planning Policy Context – Vale of Glamorgan

- 2.5 The Vale of Glamorgan Local Development Plan (LDP) (2011 – 2026)³ sets a framework for sustainable development within the Vale of Glamorgan up to 2026. Health is embedded throughout the LDP, including policy geared towards health protection, health improvement and health care.

Guidance

- 2.6 The following recognised HIA guidance has been taken into account in undertaking the assessment:
- Health Impact Assessment: A practical guide⁴;
 - National Planning Practice Guidance: Health and wellbeing⁵;
 - Wales Health Impact Assessment Support Unit Guidance and Tools⁶; and
 - Wales Health Impact Assessment Support Unit and Public Health Wales Quality Assurance Review Framework for Health Impact Assessment⁷.
- 2.7 In order to ensure the HIA is appropriate, robust and meets all requirements and expectations, responses to all criteria detailed within the Wales Health Impact Assessment Support Unit and Public Health Wales Quality Assurance Review Framework for Health Impact Assessment have been responded to in Annex B (Review Criteria Matrix).

3 Assessment Methodology

- 3.1 The assessment of health and wellbeing impacts applies a broad socio-economic model of health (see Figure 1) that encompasses conventional health impacts such as disease, accidents and risk, along with wider health determinants vital to achieving good health and wellbeing, such as employment and local amenity. It addresses both physical and mental health outcomes, and also considers equality and social impacts where possible.

Figure 1: The determinants of health and wellbeing in our neighbourhoods



Source: (Barton & Grant, 2006)

- 3.2 The assessment methodology follows a source-pathway-receptor model to identify and assess population and health effects that are plausible and directly attributable to the proposed development. As shown in Table 1, a hazard source by itself does not constitute a health risk: it is only when there is a hazard source, a sensitive receptor and a pathway of exposure that there is any potential risk to human health. The same is true for potential health benefits where a positive influence must be present alongside a pathway of exposure and a receptor for there to be any potential health improvement.
- 3.3 Where a source-pathway-receptor linkage exists, it is then the nature of the specific hazard source or positive influence; the magnitude of impact via the pathway of exposure; and the sensitivity of the receptor that will determine what level of health risk or benefit is predicted, if any.

Table 1: Source-pathway-receptor model

Source	Pathway	Receptor	Plausible Health Impact	Explanation
X	✓	✓	No	There is not a clear source from where a potential health impact could originate.
✓	x	✓	No	The source of a potential health impact lacks a means of transmission to a population.
✓	✓	x	No	Receptors that would be sensitive or vulnerable to the health outcome are not present.
✓	✓	✓	Yes	Identifying a source, pathway and receptor does not mean a health outcome is a likely significant effect; health impacts should be assessed (describing what effect will occur and its likelihood) and likely health effects are then evaluated for significance.

- 3.4 Embedded design and mitigation measures are adopted as part of the Development and target precursors to adverse health outcomes (e.g. air quality, noise etc.). Where appropriate, further mitigation relating to the environmental determinants that affect health are also proposed. Both types of mitigation have been considered in the assessment of effects in order to determine the likely health impacts of the Development. Health-specific mitigation would only be recommended in an instance where the health impacts are considered to be significant (as per the assessment within the ES).

4 Project Profile

Site description, setting and context

- 4.1 As detailed in Chapter 2 of the ES: Site and Setting, the Site is located within the Barry Docks area, which is within the Vale of Glamorgan (South Wales) and covers an area of approximately 1.07 ha.
- 4.2 The Barry Docks area comprises large areas of flat land occupied by various industrial and commercial uses, centred around the docks themselves. Typical businesses in Barry Docks and the Port of Barry include a mixture of manufacturing, storage, open storage, light industrial and commercial operations, along with aggregates and waste processing, energy generation and other related activities.
- 4.3 Specifically, in the land immediately adjacent to the Site's south western boundary, beyond Woodham Road, lies a row of 'Nissen hut' style buildings, occupied by various commercial activities including vehicle repair, catering services and warehouses. Further west is vacant scrub land, bounded by Cory Way and the curve of the freight railway line that serves the Port of Barry.
- 4.4 To the north of the Site, lies an open storage area, a haulage firm, timber products business and other commercial ventures. Approximately 130m north-west of the Site lies Barry Docks railway station and the associated railway line. To the south-east lies David Davies Road,

beyond which is the freight railway line, and then the open water of the docks. A number of the sites are occupied by large warehouse buildings. However, large areas also remain derelict, comprising underutilised hardstanding or undulating scrub land.

- 4.5 Further west from the Site is another large dock. While this dock forms part of the Port of Barry, much of the land to the south and west of this dock forms part of the Barry Waterfront residential development; with parcels of Barry Waterfront currently under construction.

Project description summary

- 4.6 As detailed in Chapter 5 of the ES: Description of the Development, the Development is a renewable energy generation facility comprising three main buildings and a single freestanding flue. It has been designed and constructed to deliver a high efficiency energy generation plant that utilises advanced thermal technology through gasification, as a means of processing fuel grade waste wood feedstock to generate renewable energy.
- 4.7 The gasification facility is an Advanced Thermal Treatment (ATT), designed to process shredded mixed waste wood feedstocks. The process creates synthesis gas that is combusted to produce heat and to raise steam in a conventional tube boiler for the production of renewable energy in a steam turbine.
- 4.8 The annual average export capacity of the Development is 10 Megawatt electric (MWe) of renewable electricity which can be exported to the Local Distribution Network Operator (Western Power) network at full load. This supply of renewable electricity equates to the annual energy usage of approximately 25,100 households based on an average UK household consumption of 3,100 kilowatt hour (kWh)/year. The median electricity consumption has decreased by 22% since 2015 from approximately 3,800 kWh/year to 3,100 kWh/year in 2021 and therefore the electricity generated today is able to power more homes.
- 4.9 The Development will operate 24 hours a day seven days a week employing 17-20 full-time equivalent staff with the exception of four weeks of the year, when planned maintenance will take place. On the busiest days, there will be up to 12 staff on Site per day, Monday to Friday and five staff on Site per day Saturday and Sunday.

Scoping exercise

- 4.10 Scoping is the process by which the focus of the assessment is set, defining the health determinants to be assessed (i.e. aspects with the potential to influence health, both adversely and beneficially); and just as importantly, identifying aspects that are considered to be outside of the scope. This is necessary to ensure the assessment is fit for purpose, meets stakeholder and consultee expectations, and identifies potential opportunities to support local and strategic health objectives, but does not cover matters that it cannot influence or does not affect.
- 4.11 The scoping process builds upon the previous stages, including the statutory consultee responses. A summary of the scoping exercise results are presented in Table 2.

Table 2: Scoping exercise results

Health determinant	Potential impact direction	Distribution	Duration
Construction			
Changes in air quality (dust and PM ₁₀)	Adverse	Local	Temporary
Changes in noise exposure	Adverse	Local	Temporary
Changes in transport nature and flow rate	Adverse	Local	Temporary
Operation			
Changes in air quality (NO ₂ , PM ₁₀ , dioxins, furans and polychlorinated biphenyls)	Adverse	Local	Permanent
Changes in noise exposure	Adverse	Local	Permanent
Changes in transport nature and flow rate	Adverse	Local	Permanent

- 4.12 The list of health determinants outlined in Table 2 are consistent with that previously scoped into the ES (informed by statutory consultees including Public Health Wales) and is representative of all credible health determinants directly attributable to what is proposed. Neither the construction, operational or decommissioning phases/activities of the Development have materially changed to warrant the consideration of new or different health determinants, and the supporting health evidence base has only increased to reinforce the previous and current scope of health assessment.
- 4.13 The HIA scope was shared with Public Health Wales for comment, who reiterated their original input to scoping, and confirmed that the HIA scope is appropriate. The only additional request for consideration, was to also explore residual health concerns that might cause stress and anxiety across the community living within the study area. On this basis, a separate section on risk perception has been included to respond to, and address such concerns and pre-conceptions of energy generation facilities, including biomass facilities.

Study area

- 4.1 Environmental health determinants (such as changes to air quality and noise exposure) typically have a local distribution pattern, where potential changes in hazard exposure are defined by the concentration of emissions and physical dispersion characteristics. Changes in transport nature and flow rate experience similar local changes. As a result, the spatial scope for health-specific baseline statistics focuses on Barry and/or the Vale of Glamorgan using the national average as a comparator.
- 4.2 The study area defining the relevant sensitive receptors identified for assessment purposes remains consistent with the inter-related technical disciplines (e.g. Chapter 8: Noise and Vibration, Chapter 9: Air Quality) assessed within the ES, which the HIA relies upon.

5 Baseline

- 5.1 Different communities have varying susceptibility to health and wellbeing effects (both adverse and beneficial) as a result of social and demographic structure, behaviour and relative economic circumstance. Annex A provides a detailed profile of local demography, health and socio-economic circumstance. Table 3 provides a summary of the pre-construction baseline (2016) and current baseline (latest data available).

Table 3: Baseline conditions summary

Indicator		Pre-Construction (2016 or range)	Current Baseline	Trend
Life Expectancy	Male	79.6 (2010 – 2014)	79.6 (2010 – 2014)	-
	Female	83.4 (2010 – 2014)	83.4 (2010 – 2014)	-
Healthy Life Expectancy	Male	66.6 (2010 – 2014)	66.6 (2010 – 2014)	-
	Female	68.7 (2010 – 2014)	68.7 (2010 – 2014)	-
Population in Barry (total)		56,124	58,486	Increasing
Deprivation – Welsh Index of Multiple Deprivation (WIMD) of LSOAs making up Barry				
20% most deprived LSOAs nationally		34% (2014)	29% (2019)	Decreasing
Mortality rates – age-standardised per 100,000 population, three-year average, persons, all ages				
Mortality from all causes		1003.9 (2014 - 2016)	1034.6 (2017 - 19)	Increasing
Mortality from cardiovascular diseases		230.7 (2014 - 2016)	245.7 (2017 - 19)	Increasing
Mortality from respiratory diseases		162.8 (2014 - 2016)	146.7 (2017 - 19)	Decreasing
Mortality from cancer		279.7 (2014 - 2016)	291.0 (2017 - 19)	Increasing

Indicator	Pre-Construction (2016 or range)	Current Baseline	Trend
Hospital admission rates – age-standardised per 100,000 population, three-year average, persons, all ages			
Cardiovascular disease related hospital admissions	1960.4 (2014/15 - 2016/17)	2034.1 (2017/18 - 2019/20)	Increasing
Respiratory disease related hospital admissions	2012.1 (2014/15 - 2016/17)	2324.7 (2017/18 - 2019/20)	Increasing
Cancer related disease related hospital admissions	1369.0 (2014/15 - 2016/17)	1641.3 (2017/18 - 2019/20)	Increasing
Mental health – age-standardised per 100,000 population, three-year average, persons, all ages			
Self-harm (emergency hospital admission rates)	255.1 (2014/15 - 2016/17)	198.8 (2017/18 - 2019/20)	Decreasing
Suicide mortality rate	11.1 (2014 - 16)	9.6 (2017 - 19)	Decreasing
Dementia/Alzheimer's mortality rate	107.5 (2014 - 16)	121.2 (2017 - 19)	Increasing
Lifestyle – age-standardised per 100,000 population, three-year average, persons, all ages			
Alcohol-specific hospital admissions	588.0 (2014/15 - 2016/17)	989.4 (2017/18 - 2019/20)	Increasing
Drug use related hospital admissions	181.2 (2014/16)	156 (2019/20)	Decreasing

5.2 Overall, levels of deprivation are improving, and while hospital admission rates are increasing, they are doing so at a higher rate than coinciding mortality rates, indicating greater intervention, treatment and recovery. Equally, mental health indicators are generally improving, with lower levels of self-harm and suicide in the current baseline compared to the pre-construction baseline. Substance abuse remains an issue, particularly alcohol abuse.

6 Assessment of Construction Effects

Health effects from changes in air quality

- 6.1 As stated in Chapter 9: Air Quality, during construction of the Development, there would have been the potential for impacts on local air quality to occur as a result of dust and PM10 emissions.
- 6.2 As with any development, the risk of dust emissions is determined by the scale and nature of the works and the proximity of sensitive receptors. It is noted that the application of

effective mitigation and the distance between the Site and any sensitive receptors was already sufficient to have prevented any significant health risk.

- 6.3 As detailed in Chapter 9: Air Quality, a site-specific dust risk assessment based on the latest guidance from the Institute of Air Quality Management (IAQM), concluded that the change in local air quality is considered to have been negligible. Construction emissions therefore represented a negligible change in local air quality, remained within air quality standards protective of health, and both concentration and community exposure remained orders of magnitude lower than is required to quantify any change in local health outcome.
- 6.4 The potential construction air quality hazards are well known, understood and would have been adequately addressed through the PEP and CPP to manage any risk to the environment and health.

Health effects from changes in noise exposure

- 6.5 Under the CPP (Appendix 6.1), construction hours were limited to daytime hours only (07:30 – 18:00 hours during Monday to Friday, and 07:30 – 15:00 hours during Saturday and Sunday). Within these hours, noise arising from activities that could potentially be heard at the Site perimeter boundary were restricted to daytime periods only, removing any potential for sleep disturbance, or the associated risk for hypertension and cardiovascular health outcomes. This limits potential health impacts to potential daytime annoyance, and cognitive function and episodic memory in schools.
- 6.6 Given the absence of any residential or academic receptors in immediate proximity to the Site, and when further considering the intermittent and temporary nature of noise generating activities during construction, construction activities were not of a scale, magnitude, duration or timing to result in any tangible impact on academic performance at any school, limiting any potential impact to temporary annoyance.
- 6.7 Based on the Noise and Vibration chapter results, there would have been negligible noise level impacts during construction activities at residential receptors and the Vale of Glamorgan Council offices with predicted noise level impacts not expected to have exceeded 65dB $L_{Aeq,T}$. Furthermore, the results indicate that there was a negligible increase in road traffic noise during the construction phase of the Development, with the highest increase in road traffic noise level being 0.7dB (i.e. below what is considered perceptible, and not of a magnitude or exposure sufficient to quantify any adverse health outcome).

Health effects from changes in transport nature and flow rate

- 6.8 Relevant health determinants associated with changes in transport nature and flow rate include increased risk of road traffic accident and injury, community severance and pedestrian amenity.
- 6.9 As stated in the Transport Technical Note (Appendix 3.10), a substantial amount of the Development construction took place over a period of approximately two years, between February 2016 and January 2018, and comprised the groundworks and the build stages. The maximum change in transport movements occurred during the groundworks stage, whereby there were up to 50 HGV trips (100 two-way movements) per day. The peak demand of up to 130 staff on-site also generated up to 50 LGVs trips (100 two-way

movements) per day. Therefore, the total vehicle trips for the groundworks stage were 100 trips (i.e. 200 two-way movements) per day to an active port.

- 6.10 While the magnitude of traffic movements during the build stage was lower than the groundworks stage, the traffic movements from the groundworks stage were used to ensure a worst-case assessment. Changes in traffic flows of less than 30% from the Site would not materially impact risk of road traffic accident and injury, community severance or pedestrian amenity.
- 6.11 Results show that of the six road links analysed, the maximum change in total vehicles experienced on any road link during the construction phase was +7% (occurring on Cory Way). All other road links experienced an increase in traffic movements of less than +2%.
- 6.12 When analysing HGV movements in isolation, the maximum change experienced on any road link during the construction phase was +3.3%. All other road links experienced an increase in traffic movements of less than 1%.
- 6.13 On the basis that changes in transport movements do not meet the 30% impact threshold, they would not have been of a level to materially impact on road safety, capacity or impact on any community severance and amenity.

7 Assessment of Operation Effects

Health effects from changes in air quality

- 7.1 The air quality health evidence base is significant, with extensive epidemiological research on a wide array of emissions, forming the basis to air quality objectives, protective of health. The following section builds upon the air quality assessment, which focusses on the relevant objective thresholds set to protect the environment and human health, by applying appropriate exposure response risk ratios to further explore and communicate the potential health impact in the context of existing local health circumstance.

Nitrogen Dioxide and Particulate Matter

- 7.2 Chapter 9: Air Quality includes modelled changes in concentrations of nitrogen dioxide (NO₂) and particulate matter (PM) associated with the stack across a 5km by 5km grid. The grid points intersect a total of 34 Lower Super Output Areas (LSOAs) located in the Vale of Glamorgan. The total population within the 34 LSOAs is 57,380, with 36,608 of the population aged 30+.
- 7.3 To estimate the change in health outcomes associated with changes in exposure to air quality, concentration-response functions (CRFs) recommended in the World Health Organisation's (WHO) Health Risks of Air Pollution in Europe (HRAPIE) guidance⁸ were applied with the absolute change in air quality (in µg/m³), population estimates, and pertinent baseline health data for the study area.
- 7.4 To ensure the assessment is as accurate as possible, a sub-assessment was undertaken for each LSOA, whereby the exposure assessment assumes the estimated population living within each LSOA is exposed to the average change in air pollutant concentration across

that specific LSOA. The results for each individual LSOA are then added together to calculate the overall result associated with the proposed project as a whole.

- 7.5 Table 4 shows the potential health outcomes associated with the predicted change in air pollutant exposure during operation.

Table 4: Population health outcomes associated with changes in air pollution

Health outcome	Number of cases attributable to the proposed project
Natural cause mortality (aged 30+)	0.23
Respiratory disease emergency hospital admissions	0.39
Cardiovascular disease hospital admissions	0.01
Total hospital admissions	0.40

- 7.6 The results indicate that changes in air quality would remain well within all air quality objectives protective of health, and are not of a nature, concentration or exposure sufficient to quantify any change in morbidity or mortality during any year of operation.

Dioxins, Furans and Dioxin-like Polychlorinated Biphenyls (PCBs)

- 7.7 A Human Health Risk Assessment (HHRA) was undertaken and is included as Appendix 9.7. The HHRA assessed the potential risk to human health arising from emissions of polychlorinated dibenzo-para-dioxins and polychlorinated dibenzofurans (PCDD/Fs, often referred to as dioxins/furans) and dioxin-like PCBs from the Development.
- 7.8 The HHRA was completed upon the worst-case and most conservative scenarios, namely that of an individual exposed for a lifetime (70 years) to the effects of the highest airborne concentrations at any point and consuming mostly locally grown food.
- 7.9 For the HHRA, the quantification of exposure was based on the worse-case scenario associated with:
- the location of the exposed hypothetical receptor and duration of exposure;
 - exposure rate; and
 - emission rate from the source.
- 7.10 Despite the highly hypothetical and unrealistically precautionary assessment scenario applied, the HHRA demonstrates that facility emissions do not present a significant risk to health from any pollutant of concern, with no measurable risk to public health over a lifetime.
- 7.11 This conclusion is consistent with the current health evidence base, where potential hazards are addressed through abatement technology, such that the resultant emissions associated with the Development are negligible, and do not represent a material risk to public health.

Health effects from changes in noise exposure

- 7.12 The relationship between noise and health outcomes is complex, with both auditory and non-auditory outcomes that vary by noise source, receptor, and can be further influenced/confounded by other sensory inputs and even individual attitudes to noise.
- 7.13 In this instance, the operation of the Development does presents any auditory health outcome (i.e. the change in noise level does not constitute a magnitude or duration sufficient to cause any physical damage to the hearing organelles).
- 7.14 Non-auditory health outcomes include the potential to impact health via annoyance and/or sleep disturbance. Chapter 8: Noise and Vibration identifies surrounding residential receptors as sensitive. The nearest identified existing and future residential premises in close proximity to the Development were identified in Chapter 8: Noise and Vibration as follows:
- R1) Existing residential housing on Dock View Road, located c.215 metres distance to the north west of the closest perimeter site boundary of the Development;
 - R2) Future residential housing (currently under construction as of May 2022), as to be located on Cory Way, c.170 metres distance to west of the closest perimeter site boundary;
 - R3) Future residential housing (currently under construction as of May 2022), as to be located on East Quay, c.100 metres distance to south west of the closest perimeter site boundary;
 - R4) Existing residential housing located on Cei Dafydd, sited c.370 metres distance to the west of the closest perimeter site boundary; and
 - R5) Existing residential housing as located on Subway Road, sited c.380 metres distance to the west of the closest perimeter site boundary.
- 7.15 As discussed in Chapter 8: Noise and Vibration, following mitigation, there is potential for “sub adverse” impacts, depending on the context at residential receptors R1, R2, and R3 during the daytime, evening and/or night-time hours.
- 7.16 A “sub adverse” impact means that the predicted overall A-weighted, BS 4142:2014+A1:2019 defined Rating Level at each of the identified noise-sensitive residential receptors were between 0dB and +4dB.
- 7.17 At R1: Dock View Road, the night-time increase was +2dB. At R2, the evening increase was +1dB and +2dB at night-time.
- 7.18 At R3: East Quay, the evening increase was +2dB and at night was +4dB. Overall, the difference between the Rating Level and the existing background sound level is below the threshold for an indication of the significant impact (i.e. a limiting Rating Level that exceeds the Background Sound Level by +5dB or greater, depending on the context).
- 7.19 A change of 3dB is typically considered to be the threshold of a perceptible change in noise. For the majority of the residential receptors the change is less than 3dB, with the exception of one location (i.e. R3). Although one of the five residential receptors would border on a

perceptible change in noise, the nature and magnitude remain below a quantifiable change to health.

- 7.20 Further to the additional noise mitigation measures, continuous 24-hour environmental noise monitoring will be undertaken as per Chapter 8: Noise and Vibration to immediately alert the site operator of noise issues, and enable intervention prior to any manifest health outcome.

Health effects from changes in transport nature and flow rate

- 7.21 Relevant health determinants associated with changes in transport nature and flow rate include increased risk of road traffic accident and injury, community severance and pedestrian amenity.
- 7.22 As stated in the Transport Technical Note (Appendix 3.10), on a typical operational day, the delivery of biomass to the facility would result in approximately 14 HGV movements. However, there may be occasions when deliveries may be late or delayed; therefore, to ensure the assessment is worst case, up to 15 HGV biomass deliveries per day have been assumed.
- 7.23 Other deliveries to the operational Development comprise hydrated lime and urea pill, which would not be delivered daily. Hydrated lime would require up to one HGV delivery per week, while urea pill would require up to one HGV delivery every two weeks. The Development would generate both fly ash and air pollution control residues (APCR) which would both need exporting from the Development. The number of HGVs required to export fly ash would be between two and three per week, with no more than one visit on any one day. The number of HGVs required to export APCR would be two per week, with no more than one visit on any one day.
- 7.24 Overall, for the purposes of considering the worst-case scenario, whereby all HGV deliveries/removal trips converge on a singular day, the total number of daily HGV movements is assumed to be 19 (38 two-way movements) to an active port.
- 7.25 In addition, on the busiest days, there would be up to 12 staff on site per day Monday to Friday and five staff on site per day Saturday to Sunday. Following the application of Census data, it is assumed that there would be eight staff car trips per day (16 two-way movements).
- 7.26 Changes in traffic flows of less than 30% from the baseline would not materially impact risk of road traffic accident and injury, community severance or pedestrian amenity.
- 7.27 Results show that of the six road links analysed, the maximum change in total vehicles experienced on any road link during the construction phase was +1.9% (occurring on Cory Way). All other road links experienced an increase in traffic movements of less than +0.5%.
- 7.28 When analysing HGV movements in isolation, the maximum change experienced on any road link during the construction phase was +1.3%. All other road links experienced an increase in traffic movements of less than 1%.
- 7.29 The predicted changes in transport movements do not meet the 30% impact threshold, and therefore, do not present any tangible risk to public health.

8 Risk Perception

- 8.1 Existing pre-conceptions surrounding biomass facilities are typically linked to energy from waste facilities, and can give rise to a wide range of perceived health risks, that if left unaddressed can fester and affect the mental health of the community.
- 8.2 Such subjective and intangible factors are generally not effectively addressed through the regulatory assessment or permitting process, which concentrate on changes in environmental and socio-economic conditions directly attributed to what is proposed and are structured to comply with planning requirements and expectations. For this reason, non-regulatory required assessments such as HIA are increasingly commissioned voluntarily to proactively investigate, assess and address local concerns and fears through the factual dissemination of scientifically robust information.
- 8.3 In this instance, the HIA provides a robust assessment of the health determinants associated with the Development and applies a robust scientific evidence base for each. The HIA is therefore intended to inform decision making, but is also intended as a source of information to help alleviate local community concerns and perceived risk through the assessments provided, and any additional mitigation proposed.
- 8.4 All credible health determinants directly attributable to what is proposed, and raised during the previous stages of consultation have been investigated, and it is demonstrated that the operation of the Development will have a negligible impact on environmental circumstance, and no measurable impact on health, while supporting low carbon energy generation, energy security and reducing dependence on fossil fuels. This conclusion tests and confirms the position of the UK Health Security Agency (formally PHE)⁹.
- 8.5 While this is the case, it is noted that residual risk perceptions can persist, and as shown in Table 5 (overleaf), have been raised on a number of previous planning determinations and appeals (particularly for energy from waste facilities).

Table 5: Energy from waste: perceived health issue raised in decisions

Case	Date	Context	Decision
Lostock Energy from Waste – Fuelled Generating Station	October 2012	Public concerns about perceived health impacts and increase in dioxin in abnormal operating conditions	The development has well established processes for dealing with emissions and the release of pollutants in abnormal operating conditions and compliance with the Waste Incineration Directive and the revised Waste Framework Directive.
Sinfin Lane EfW, Derby	September 2012	Concern regarding air pollution and subsequent perceived risk to health	I am satisfied that the environmental permit has been issued after a detailed examination of the plant and its capabilities, the processes and controls involved and the likely impacts upon the environment and health.
Ringaskiddy EfW Facility	June 2011	Concern increase in dioxin	The Total Weekly Intake (TWI) levels will be too low to cause impact on human health.
Ardley EfW Oxfordshire	December 2010	Concern regarding air pollution and subsequent perceived risk to health	There is no evidence, which demonstrates the appellant’s assessment should not be accepted. There was no support of the objector’s views from the relevant consultees. Furthermore, the inspector concluded that ‘most of the concerns are not planning matters as they are dealt with by the EA’.
Oxwellmains EfW, Dunbar	December 2010	Concern regarding air pollution and subsequent perceived risk to health	Satisfied that there was no evidence to conclude that the impacts of the proposal were likely to exceed current air quality objectives and limits, or would otherwise be unacceptable. ‘Fundamentally, the issue of impact on public health stands to be considered under the PPC licensing regime’.
Shore Road EfW, Perth	November 2010	Concern regarding air pollution and subsequent perceived risk to health	Same Recorder as Oxwellmains EfW with same reasoning.
Sinfin Lane EfW, Derby	November 2010	Concern regarding air pollution and subsequent perceived risk to health	The Inspector concluded that residents’ fear in itself is not sufficient on its own to warrant refusal, but did accord it some weight in the final decision’.

Case	Date	Context	Decision
Avonmouth Biomass	March 2010	No objection raised on health grounds	No further consideration was given to health issues.
Teesport Biomass Extension	March 2010	No objection raised on health grounds	No further consideration was given to health issues.
Rivenhall EfW, Essex	March 2010	Concern regarding air pollution and subsequent perceived risk to health	The Inspector concluded that the plant could be operated without causing material harm to human health. Despite this, the concern of local residents to health risk, albeit unfounded, would remain as a detrimental impact of the development.
Peterborough EfW	November 2009	Concern regarding air pollution and subsequent perceived risk to health	Secretary of State determined that in light of the need for an environmental permit to operate, and the position of the Health Protection Agency there was no need to consider the matter further.
Teesport Biomass	July 2009	No objection raised on health grounds	No further consideration was given to health issues.
Tilbury Docks EfW, Essex	August 2009	No objection raised on health grounds	No further consideration was given to health issues.
Eastcroft EfW, Nottingham	December 2008	Concern regarding air pollution and subsequent perceived risk to health from communities and GP	The inspector noted that the appellants' evidence showed significant margins would exist between the impact of the proposed and the recognised thresholds where health could be affected. He also noted that despite the views of local GPs, the PCT Health Impact Assessment concluded that a perception of risk rather than actual risk could occur. The inspector was not persuaded that the perceptions were a reason for refusal especially in light of WSE2007. The Inspector concluded that there would not be any material risk to the health of the local population.
Ince Marshes EfW, Cheshire	October 2008	Concern regarding air pollution and subsequent perceived risk to health	The inspector identified that the perception of a risk to health was the principal matter of objection. The Inspector was not persuaded by the evidence of objectors about a direct impact on health as it did not relate to modern incineration plants. He concluded that the public anxiety should not carry great weight.

Case	Date	Context	Decision
Ineos Chlor EfW, Cheshire	September 2008	Regarding air pollution and subsequent perceived risk to health	Health Impact Assessment was made a planning condition to further investigate and address local community concerns and perceived risks.
Stallingborough, Lincolnshire	June 2008	No objection raised on health grounds	No further consideration was given to health issues.

- 8.6 In summary, a review of pertinent cases where perceived health risks have been raised demonstrates that:
- there is an established regulatory regime that controls hazards and manages risk from regulated facilities, including emissions and accidents that have the potential to affect health;
 - local feelings and public opposition in its own right are not sufficient grounds for a material consideration;
 - although perceptions of risk are given weight during planning decisions, unjustified and unsupported fear in itself is not sufficient on its own to warrant refusal;
 - where such concerns are justified, they are considered alongside other material factors and balanced against benefits to form the final decision;
 - there is little legal support for turning down development on the sole basis of unjustified perception; and
 - unfounded fear would rarely (if ever) be a reason to justify the withholding of planning permission.
- 8.7 The review further reinforces that the potential hazards are well known understood and addressed through design, abatement technology and some of the most rigorous regulatory and permitting requirements of any sector, such that the risk to air quality is negligible, with no material risk to public health.

9 Cumulative Effects

- 9.1 Cumulative projects have been considered where there is the potential to interact with the health determinants assessed, modify exposure pathways or introduce new receptors.
- 9.2 2019/01371/RES is for the landscaping of public open space. On the basis that this development does not introduce any new receptors, it is not considered relevant to the cumulative assessment of population and human health effects and has been scoped out.
- 9.3 Similarly, 2021/00379/FUL is for the construction of new primary school, access, car parking, landscaping and associated works, which is currently under construction located >1km from the Development. Due to its distance from the Development and on the basis that receptors would be present at the primary school for only part of the day (the majority of which would be spent inside classrooms), this development is not considered relevant to the cumulative assessment of population and human health effects and has been scoped out (where neither noise or air quality exposure will be significant).
- 9.4 The following four residential developments are located within 1km of the Development, are currently under construction and are considered relevant to the cumulative assessment of population and human health effects:
- 2019/01393/RES – residential development for 58 units, together with single retail unit and all associated engineering works;
 - 2019/01386/RES – approval is sought for the layout, appearance, scale landscaping for a 3-storey apartment block, the Reserved Matters of Planning Permission ref. 2009/00946/OUT (36 units);

- 2019/01385/RES – reserved matters submission for 56 dwellings at East Quay, Barry Waterfront; and
- 2019/01384/RES – approval is sought for the appearance, landscaping, layout and scale (the Reserve Matters) as prescribed by Condition 4 of the Outline Planning Permission (2014/00229/EAO) for East Quay, which comprises of a residential development of 62 dwellings with associated works.

9.5 The occupation of the above developments would introduce additional sensitive receptors to the study area. Applying the UK average household size of 2.4 people per dwelling (and not considering any net additional effects i.e. individuals moving from within the study area), the additional population would equate to approximately 509 people.

9.6 In the context of the population assessed within the study area (a total population of 57,380 people) whereby no measurable change to population health outcomes is reported, the cumulative developments identified are not anticipated to change the results or conclusions of the main assessment undertaken in the above sections.

10 Conclusions

10.1 The HIA has assessed the potential impacts of the Development on the local population. The assessment was conducted by determining the baseline health conditions before the construction of the project and the current baseline (post-construction) conditions. The determinants that would likely impact the health of the community were reviewed and an assessment of the potential health effects based on the pathways of exposure were assessed. Based on the baseline conditions, in general, the existing burden of poor health is worse than the national average – this has been applied to inform a precautionary assessment approach.

10.2 During construction of the Development, mitigation measures to prevent any significant health effects from occurring would have been applied to address any changes in air quality. Similarly, the health effects from changes in noise exposure were restricted to certain hours of the day. During the construction phase, the changes to the transport movements were not significant as the change in movements in the local area do not meet the 30% impact threshold.

10.3 During operation of the Development, health effects from changes in air quality would not lead to any measurable change in health outcomes. The changes in noise indicate that the worst-case impact would be at +4dB. Furthermore, the impact from transport movements would be significant as the change in movements in the local area do not meet the 30% impact threshold.

10.4 Mitigation and monitoring target precursors to adverse health outcomes (e.g. air quality, noise etc.), and is tied into the regulatory permit to operate. This means the facility will be subject to a stringent monitoring regime that facilitates intervention, including the removal of the permit to operate should it breach any requirement. While this is sufficient to protect public health, it may not fully alleviate local health concerns. On this basis, ongoing engagement with local communities is required to share and disseminate findings, while aligning any community support initiatives.

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- ² Welsh Government (2021). *Planning Policy Wales (Edition 11)*. Available at: <https://gov.wales/planning-policy-wales> (Last accessed: March 2022).
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- ⁵ Ministry of Housing, Communities & Local Government (2019). *Planning practice guidance: Healthy and safe communities*. Available at: <https://www.gov.uk/guidance/health-and-wellbeing>
- ⁶ Wales Health Impact Assessment Support Unit (n.d.). *Guidance and Tools*. Available at: <https://phwwhocc.co.uk/whiasu/resources/> (Last accessed: April 2022).
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- ⁸ World Health Organisation (2013). Health risks of air pollution in Europe – HRAPIE project. Available at: https://www.euro.who.int/_data/assets/pdf_file/0006/238956/Health_risks_air_pollution_HRAPIE_project.pdf (Last accessed: May 2022).
- ⁹ Public Health England (2019). PHE statement on modern municipal waste incinerators (MWIs) study. Available at: <https://www.gov.uk/government/publications/municipal-waste-incinerators-emissions-impact-on-health/phe-statement-on-modern-municipal-waste-incinerators-mwi-study#:~:text=PHE%20's%20risk%20assessment%20remains,likely%20to%20be%20very%20small> (Last accessed: July 2022)

Annex A: Population and Human Health Baseline

Introduction

Individuals and communities have varying susceptibilities to adverse and/or beneficial population and health effects associated with changes in environmental and socio-economic conditions as a result of demographic structure (i.e. age); existing burden of poor health; behaviours (i.e. lifestyle choices which constitute risk factors); and socio-economic circumstance.

This Appendix aims to collect an extensive amount of baseline data to interpret the local health and socio-economic circumstance of the Built Up Area of Barry, using the national (Wales) average as a relevant comparator. Where Barry level data is unavailable (i.e., the best fit for the Barry Build up Area and Lower Super Output Areas in Wales was identified), the representative data at the 2011 Census Middle Layer Super Output Area (MSOA) layer was utilized by averaging the seven MSOAs corresponding with the LSOAs (i.e., The Vale of Glamorgan 007, 008, 009, 010, 012, 013, 015). In instances where the MSOA data were not available, the Local Authority (LA) (i.e., Vale of Glamorgan), and/or Cardiff and Vale University Health Board were utilized. The smallest to largest statistical geography has been identified as such: Barry BUA, seven MSOAs that correspond with the Barry BUA (i.e., The Vale of Glamorgan 007, 008, 009, 010, 012, 013, 015), Vale of Glamorgan LA, and the Cardiff and Vale University Health Board.

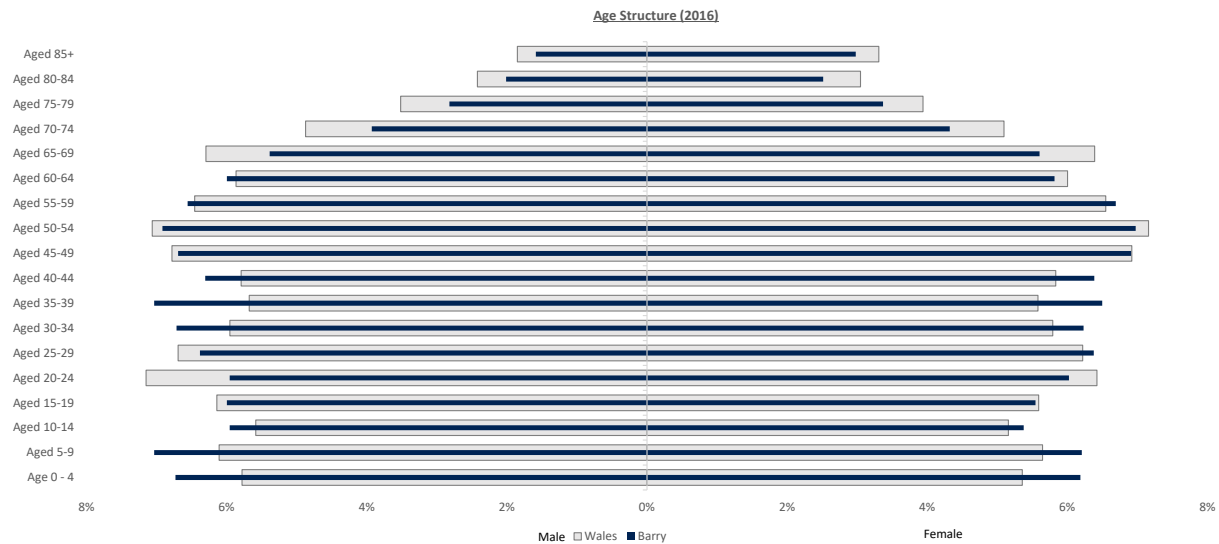
Additionally, trends data has been collected where possible to explore the changes between the pre-construction (2016) baseline conditions and current baseline conditions. For the assessment, the current baseline health and demographic data are used. On the basis that public health generally shows an improvement over time, the use of data from the current baseline is considered to be conservative of future circumstance and as such provides a precautionary approach deemed appropriate for the EIA. Throughout the quantitative assessment, the highest burden of poor health at any given time has been utilized to be consistent with the precautionary approach.

Population

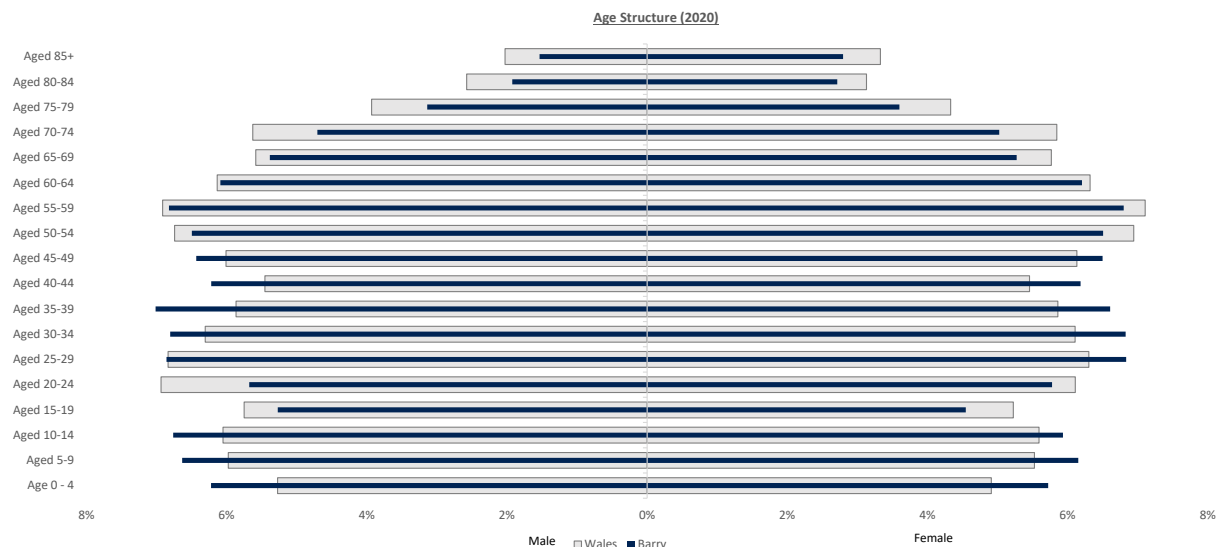
The 2016 age structure for Barry shows a high proportion of the population aged 0 to 14 years old, 25 to 44 years old, and 55 to 64 years old compared to Wales. Compared to the national average, the age structure shows a low proportion of the population aged between 15 and 24, 45 and 54, and 65+ years for Barry.

The 2020 age structure for Barry shows a high proportion of the population aged 0 to 14 years old, 25 to 49 years olds compared to Wales. Compared to the national average, the age structure shows a low proportion of the population aged between 15 and 24, and aged 50+ years for Barry.

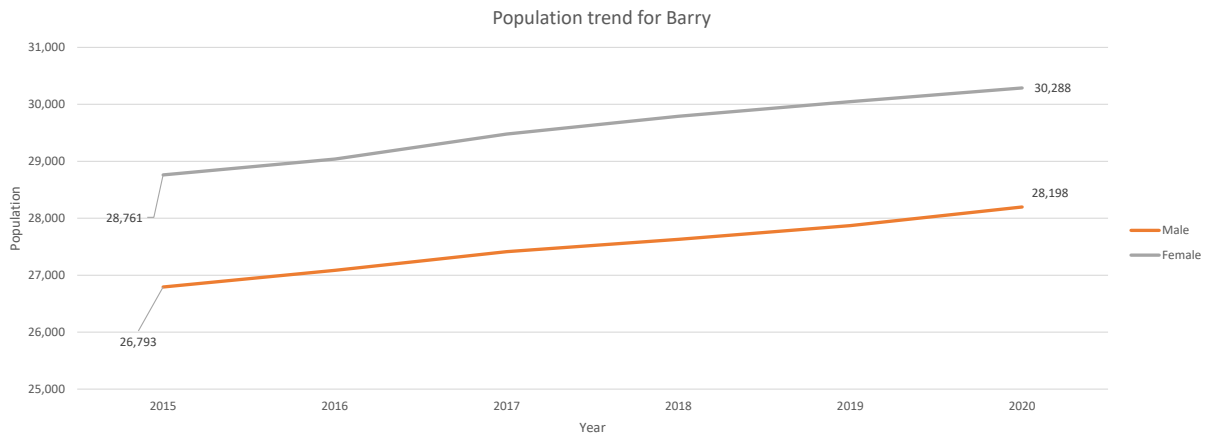
Since 2015 the population for males and females has increased in Barry. Between the years of 2016 and 2020, the population in Barry has increased by nearly 2.5 times the population increase for Wales.



Source: NOMIS



Source: NOMIS



Source: NOMIS

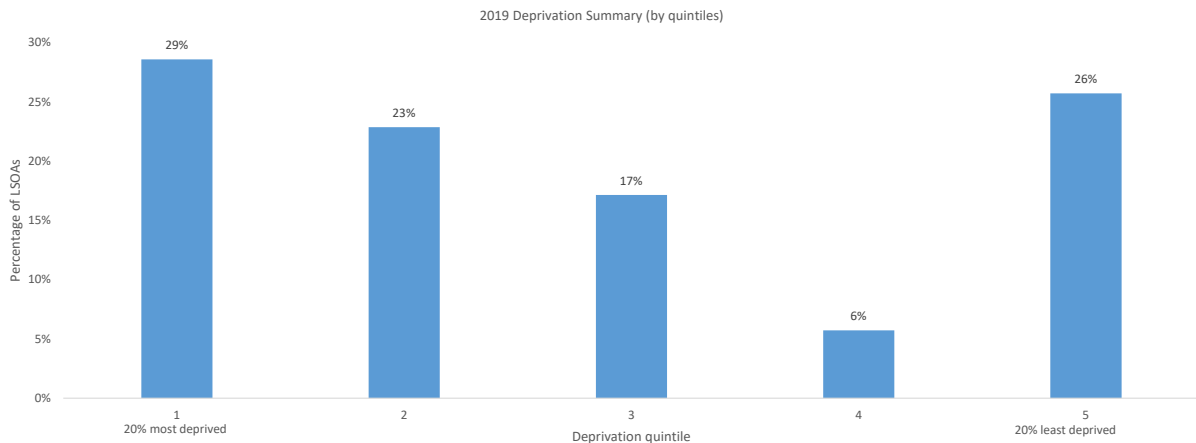
Total Population Change between 2016 and 2020

Area	2016	2020	Percent Change
Barry (BUA)	56,124	58,486	4.2%
Wales	3,113,150	3,169,586	1.8%

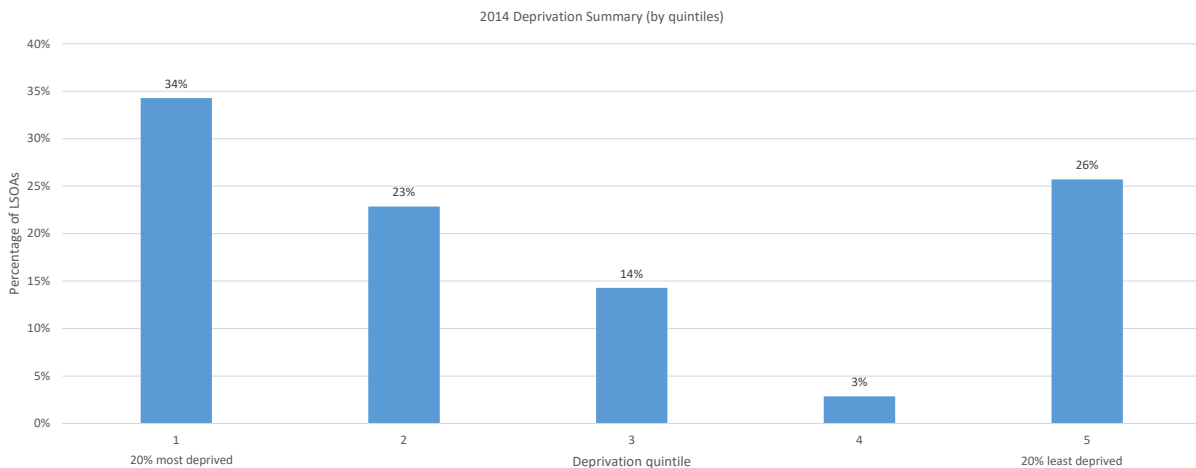
Source: NOMIS

Deprivation

The Welsh Index of Multiple Deprivation (WIMD) is the Welsh Government's official measure of relative deprivation for small areas in Wales. It identifies areas with the highest concentrations of several different types of deprivation. The WIMD ranks all Lower Super Output Areas (LSOAs) in Wales from 1 (most deprived) to 1,909 (least deprived). As shown below, of the 35 LSOAs which make up the Build Up Area (BUA) of Barry, the largest proportion of LSOAs (29%) which make up Barry is categorised within the 20% most deprived LSOAs nationally (i.e., deprivation quintile group 1). Additionally, 23% of the LSOAs in Barry are in quintile group 2 (i.e., 20-30% most deprived). Based on the preconstruction 2014 deprivation summary, the largest proportion of LSOAs (34%) which make up Barry is categorised within the 20% most deprived LSOAs nationally (i.e., deprivation quintile group 1). Additionally, 23% of the LSOAs in Barry are in quintile group 2 (i.e., 20-30% most deprived). Although 26% of the LSOAs within Barry are categorized within the 20% least deprived LSOAs nationally, the data suggests that there is a disparity in terms of deprivation across the communities in Barry.



Source: StatsWales

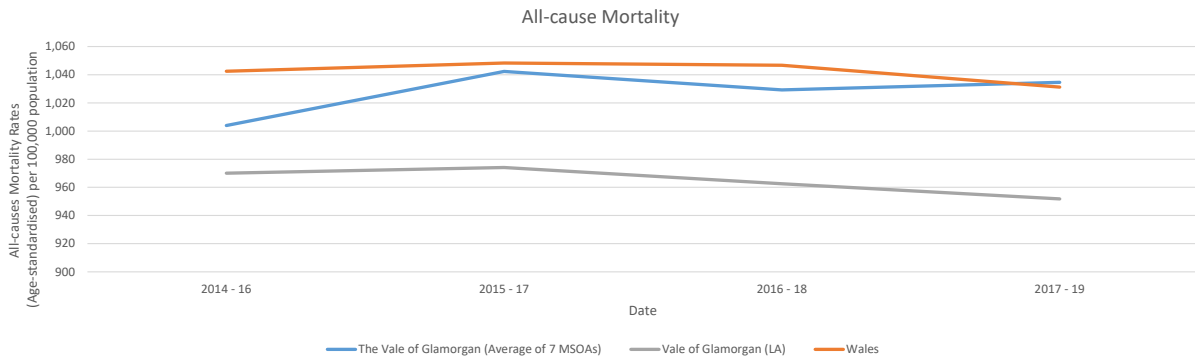


Source: StatsWales

Physical health

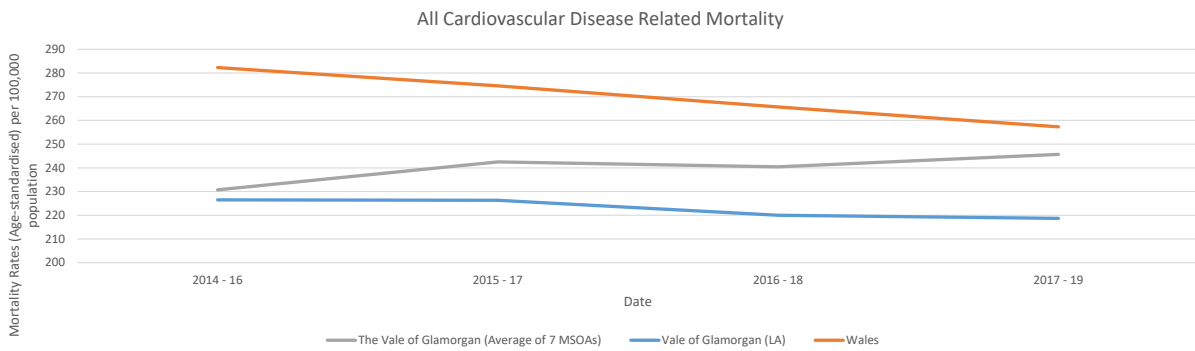
Mortality

As shown in the chart below, the all-cause mortality rate has been increasing in the MSOAs (based on the average) between the years of 2014-16 and 2017-19 from 1,004 per 100,000 population to 1,034 per 100,000 population. In the Local Authority (LA), the all-cause mortality rate has been decreasing between the years of 2014-16 and 2017-19 from 970 per 100,000 population to 952 per 100,000 population. In Wales, all-cause mortality has remained relatively static, decreasing from 1,042 per 100,000 population to 1,031 per 100,000 population in the same period. Therefore, most recent statistics show that all-cause mortality in the MSOAs is higher than the LA and national rates by approximately 83 people per 100,000 population and 3 people per 100,000 population, respectively.

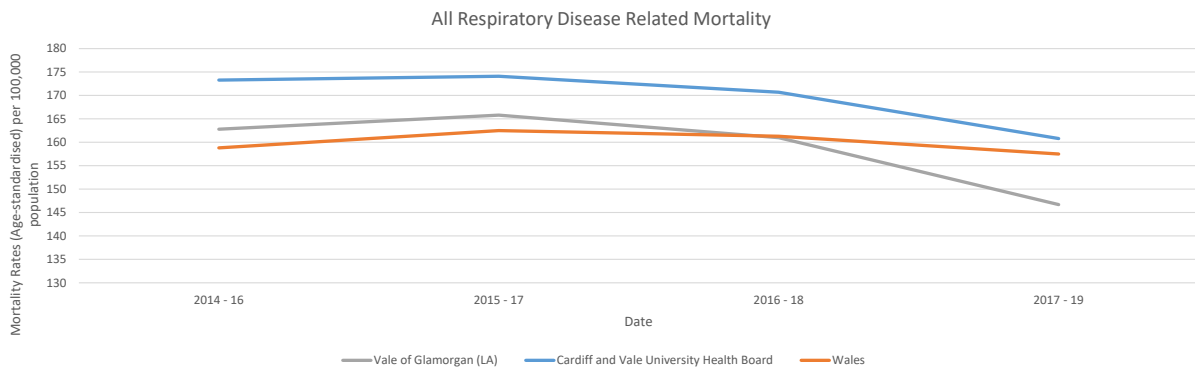


Source: Health Map Wales

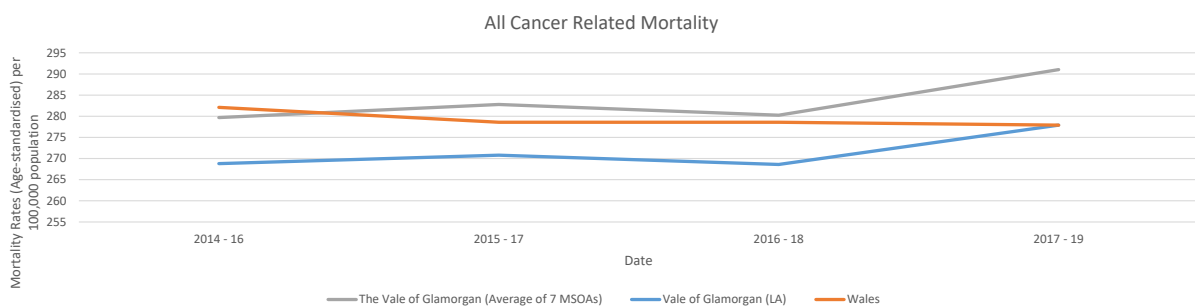
The following graphs show the age-standardised mortality rate (per 100,000 population) for a range of disease types, namely, cardiovascular disease, respiratory disease and cancer. Based on the MSOAs data, both cardiovascular disease and cancer mortality rates show an increase between 2014-16 and 2017-19. MSOA data for mortality rates related to respiratory disease were not available and as such the LA and health board data were assessed. The mortality rates related to respiratory disease have decreased in the LA between 2014-16 and 2017-19. Compared to the national data, the mortality rate related to cancer was higher in the MSOAs. The mortality rate for all specific causes (i.e., cardiovascular, respiratory and cancer) is consistently lower in the LA when compared to the national rates.



Source: Health Map Wales



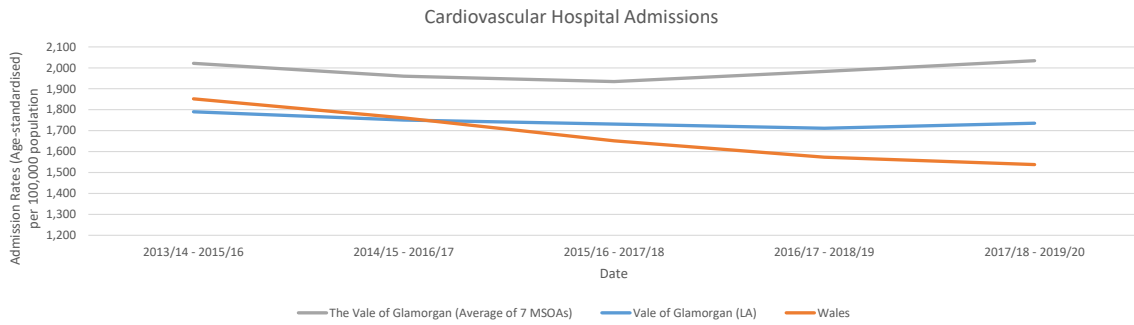
Source: Health Map Wales



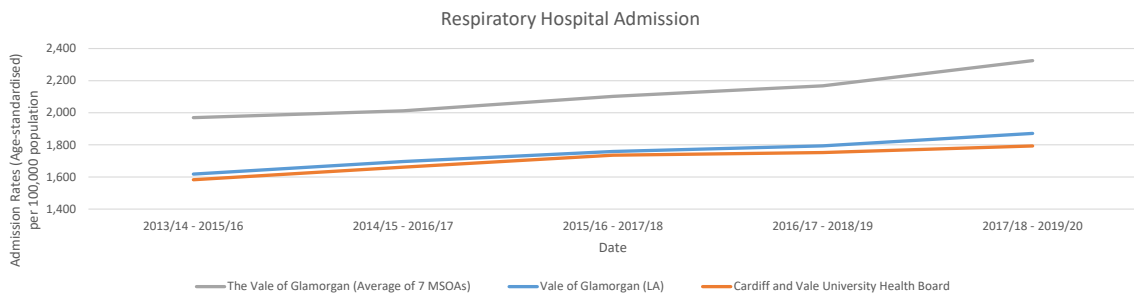
Source: Health Map Wales

Hospital admissions

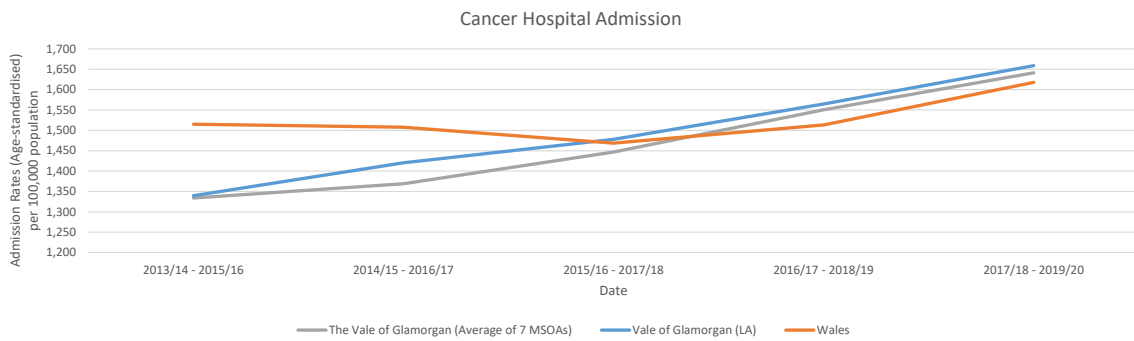
The following charts show hospital admission rates for a range of disease types, namely, cardiovascular disease, respiratory disease and cancer. The cardiovascular and respiratory hospital admissions rates in the MSOAs are higher than the comparators between the years of 2013/14-2015/16 and 2017/18-2019/20. Cancer hospital admission rates in the MSOAs are higher than the national rates but lower than the LA rates. Over the years, the rates for cardiovascular disease, respiratory disease and cancers have shown an increase.



Source: Health Map Wales

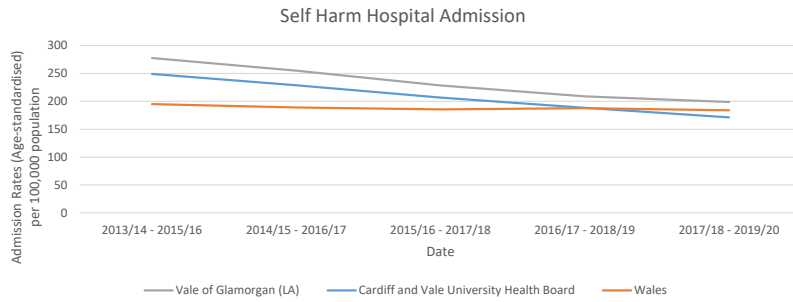


Source: Health Map Wales



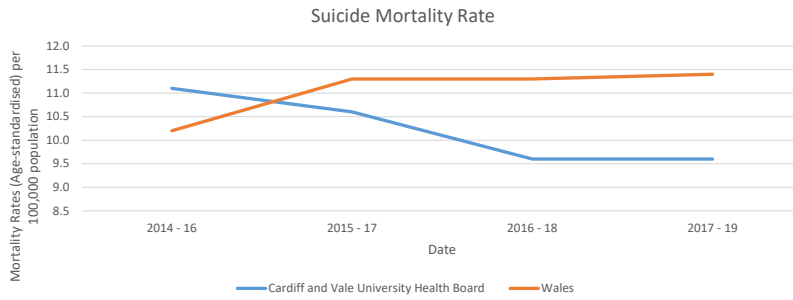
Source: Health Map Wales

Mental health



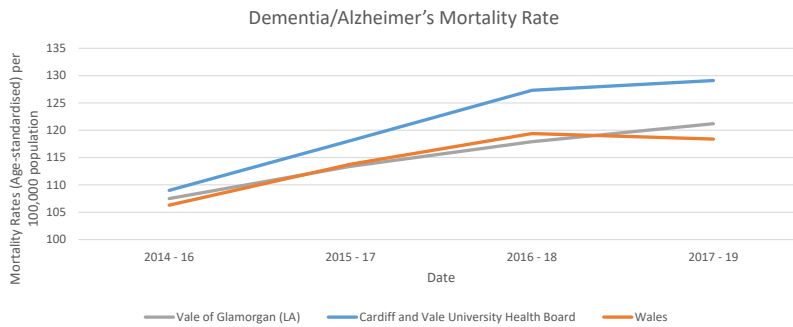
The chart on the left shows the hospital admission rate for self-harm, which is used as a proxy indicator for mental health. Hospital admissions for self-harm in the LA have been consistently above the Health Board and national averages in all years analysed and has decreased over the years.

Source: Health Map Wales



Suicide mortality rates across Cardiff and Vale Health Board have decreased over the year. Between the years 2015-17 and 2017-19, the mortality rates related to suicides were lower than the national average.

Source: Health Map Wales

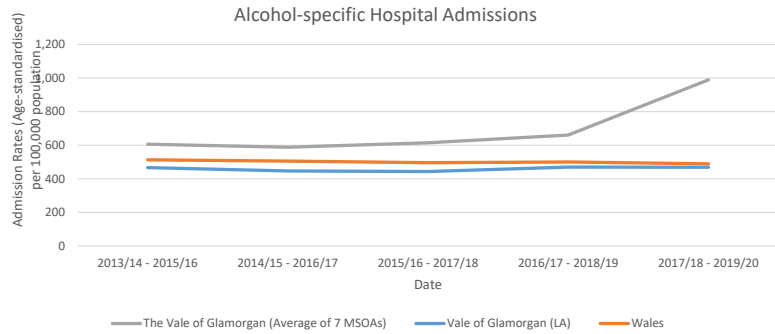


The dementia/Alzheimer's mortality rate has been increasing in the LA over the years, consistent with the Cardiff and Vale Health Board and national averages. In 2016-18, the mortality rate from dementia/Alzheimer's was lower in the LA compared to the national average. However, the mortality rate from dementia/Alzheimer's has been increasing at a faster rate in the LA compared to the national average on the basis that the most recent data (2017-19) for the mortality rate from dementia/Alzheimer's has been higher than the national average.

Source: Health Map Wales

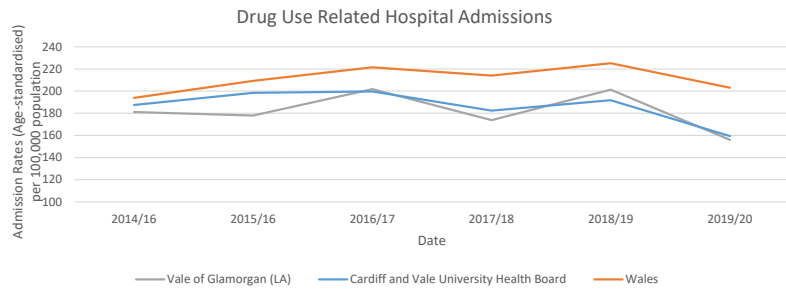
Lifestyle

The alcohol-specific hospital admission rate in the MSOAs is consistently higher than the LA and the national average. Since 2016/17-2018/19, the alcohol-specific hospital admission rate has been increasing whereas the LA and national rates have remained stable, with a slight decrease.



Source: Health Map Wales

The drug-related hospital admission rate in the LA is consistently lower than the national average. Although there are fluctuations in the hospital admission rates, the most recent statistics show that the drug-related hospital admission rate in the LA is consistent with the Health Board and lower than the national average by approximately 47 people per 100,000 population.



Source: Health Map Wales

Conclusions

Overall, the indicators show that the local health circumstance in the MSOAs is considered worse than the national average. While there are indicators that are considered to be better than the national average, the analysis of the baseline data does not exclude the probability that there would be individuals considered to be particularly vulnerable to changes in environmental and socio-economic factors (both adversely and beneficially) whereby they could experience disproportionate effects when compared to the general population. On this basis, a precautionary approach has been applied by assuming that the population within the study area is of uniformly high sensitivity. Throughout the quantitative assessment, the highest burden of poor health at any given time has been utilized to be consistent with the precautionary approach.

Annex B: Review Criteria Matrix

1 Quality Assurance Review for Health Impact Assessment (HIA)

- 1.1 The Wales Health Impact Assessment Support Unit (WHIASU) and Public Health Wales (PHW) have developed a review framework for HIA as a tool to ensure HIAs conducted in Wales are appropriate, robust and meet their requirements and expectations.
- 1.2 While any full review would be conducted externally, to aid this process the review framework has been applied to aid this process by signposting as to how and where all the requirements and review criteria have been met.

Criteria	Comments
Section 1: Information about the project, policy, plan or proposal	
<p>1.1 There is a clear description of the project or plan being assessed including:</p> <ul style="list-style-type: none"> ▪ Aims and objectives ▪ Organisational relationships (e.g. who “owns” the project? are there any key partnerships?) ▪ Where is the funding coming from for the project and the HIA ▪ The context in which the project or plan ‘sits’ (e.g. geographic, population, the physical location) ▪ Timeframes ▪ Links or distance to other neighbouring projects if relevant (as there may be cumulative impacts) ▪ The national and/or local policy context 	<p>A description of the project is provided in Sections 1, 2 and 4 of the HIA.</p> <p>The Introduction (Section 1) discusses the organisational relationships of the project and the purpose of the HIA.</p> <p>The Project Profile (Section 4) discusses the site description, setting and context. Timeframes associated with the project are outlined in Chapter 5 of the ES: Description of the Development, and are inherent to the assessment of health effects.</p> <p>Section 2 (Legislation, Planning Policy and Guidance) provides the national and local policy context.</p> <p>The links and distance to relevant neighbouring projects are considered in Section 9 (Cumulative Effects) of the HIA. The section outlines which neighbouring projects are relevant and why, and provides additional assessment for the projects which are relevant.</p>
Section 2: Methodology: Is it an HIA? Has it followed a recognised HIA methodology?	
<p>2.1 There is a clear explanation of the HIA methodology used including:</p> <ul style="list-style-type: none"> ▪ Screening ▪ Scoping - any geographical, population or other limits, and how and why these were agreed. ▪ Assessment/appraisal ▪ Recommendations and reporting 	<p>The general methodology of the HIA is outlined in Section 3 (Assessment Methodology). Specifically, it outlines that a broad socio-economic model of health (Barton & Grant, 2006) has been applied, and that the assessment follows a source-pathway-receptor model to determine whether there is a credible risk to health or not.</p> <p>Section 4 (Project Profile) provides a clear explanation of the scoping exercise conducted for the project, including confirmation with PHW.</p>
<p>2.2 The HIA is planned and timed to inform the relevant decision making/project management processes</p>	<p>Health was original scoped in the preceding work, and the scope conformed with PHW, the HIA has since built upon the original work, further tested the scope with PHW and worked across all the pertinent technical disciplines to embed and assess health.</p>
<p>2.3 The aims and objectives for the HIA are clear and relevant.</p>	<p>The objective of the HIA is outlined in Section 1 (Introduction).</p>
<p>2.4 The HIA has been framed around a definition of health and wellbeing that is holistic (physical and mental) and includes the social (wider) determinants of health</p>	<p>As stated in Section 3 (Assessment Methodology), a broad socio-economic model of health (Barton & Grant, 2006) has been applied that encompasses conventional health impacts such as disease, accidents and risk, along with wider health determinants vital to achieving good health and wellbeing, such as employment and local amenity. It addresses both physical and mental health outcomes, and also considers equality and social impacts where possible.</p>
<p>2.5 The assessment tools/frameworks/checklists used are included in the report and they include physical, mental, and social health and wellbeing along with the wider determinants of health.</p>	<p>Recognised HIA guidance has informed the completion of the HIA and is referenced in Section 2 (Legislation, Planning Policy and Guidance).</p>

Criteria	Comments
<p>2.6 The screening and scoping process identifies the people and vulnerable groups who may be impacted on by the proposal and how they will be engaged in the HIA process</p>	<p>The results of the scoping exercise summarised in Table 2 of Section 3 (Assessment Methodology) outlines the potential distribution of health impacts and has informed the study area which is described in Section 4 (Project Profile).</p> <p>The population who are most likely to be affected have been engaged with during the consultation process undertaken by the central EIA team. This is summarised within Section 10.3 of Chapter 10 (Population and Human Health) of the ES and identifies specific themes of risk perception which are addressed within Section 8 (Risk Perception) of the HIA.</p>
<p>2.7 The report identifies all the stakeholder groups who are relevant to making an assessment of health impact for this project and how they were to be engaged in the HIA</p>	<p>Stakeholder engagement has been undertaken as part of the central EIA process. Specifically, WHIASU, who were consulted with previously, were consulted with again to confirm the scope and focus of the HIA. This is summarised within Section 10.3 of Chapter 10 (Population and Human Health) of the ES.</p>
<p>2.8 There is a clear explanation of the roles and responsibilities in the HIA and the organisations they represent.</p>	<p>Section 1 (Introduction) discusses that the HIA was prepared by the Savills Health and Social Impact Assessment team within the Environment & Infrastructure department, on behalf of Biomass UK No.2 Limited.</p>
<p>Section 3: Evidence: Is the evidence used to identify and assess impacts robust?</p>	
<p>3.1 The HIA report includes the key types of evidence required.</p> <ol style="list-style-type: none"> 1. Community /population health and socioeconomic data profile 2. Literature/evidence review 3. Stakeholder opinion and experience 4. Technical data (if relevant) i.e. air quality statistics or health outcome projections 	<p>A full baseline detailing data relating to local demographic structure, socio-economic circumstance, physical health, mental health and factors which affect lifestyle is provided as in Annex A of the HIA, a summary of which is provided in Section 5 (Baseline) of the HIA.</p> <p>The literature which has informed the assessment of effects is accurately referenced throughout the HIA.</p> <p>Stakeholder input including statutory consultees have informed the scope and focus of the HIA.</p> <p>The technical data that informs the assessment of effects has not been replicated within the HIA for the sake of brevity. While this is the case, cross-referencing to the ES has been used to aid transparency.</p>
<p>3.2 Community /population health profile (quantitative and qualitative).</p> <ul style="list-style-type: none"> ▪ This should provide sufficient information on the physical and mental health and wellbeing and social determinants of health for the affected populations and any vulnerable groups identified in order to assess possible impacts. ▪ The profile should contain indicators of physical and mental health and wellbeing relevant to the project under assessment. ▪ There should be a narrative which interprets the data collected in the context of the HIA. A list of tables and data is not sufficient. 	<p>A full baseline detailing data relating to local demographic structure, socio-economic circumstance, physical health, mental health and factors which affect lifestyle is provided in Annex A of the HIA, a summary of which is provided in Section 5 (Baseline) of the HIA.</p> <p>Narrative accompanies all the data tables presenting the baseline data, and trends have been analysed where this is possible.</p>

Criteria	Comments
<p>3.3 Literature/evidence review.</p> <ul style="list-style-type: none"> ▪ The search strategy is clear ▪ The methodology and sources used are relevant to the project and scale of the HIA. ▪ The quality and depth of evidence is sufficient to inform the assessment of likely impacts ▪ There is some critical assessment of the literature used 	<p>An appropriate supporting health evidence base underpins the assessment and is referenced accordingly.</p>
<p>3.4 Stakeholder knowledge and experience (qualitative).</p> <ul style="list-style-type: none"> ▪ The methods of engagement were appropriate and their effectiveness evaluated. ▪ The range of stakeholders and how many people from different groups were engaged is recorded. 	<p>The HIA builds from previous engagement, and the scope was shared with Public Health Wales for comment, where they reiterated their original scoping input and confirmed the HIA scope to be appropriate. The only additional request from Public Health Wales was to also explore potential residual health concerns that might cause stress and anxiety.</p>
<p>3.5 Technical data</p> <p>The HIA uses robust data sources on air quality, noise, transport or from other key environmental, economical or technical disciplines where relevant to the proposal and possible impacts.</p>	<p>The HIA draws from and builds upon key assessment outputs from the relevant technical disciplines (i.e. air, noise, transport and HHRA).</p>
<p>3.6 Any limitations of the evidence collected are highlighted and a rationale provided.</p>	<p>Section 5 highlights that the latest available data are used for the baseline. Additionally, Section 6 (Assessment of Construction Effects) and Section 7 (Assessment of Operation Effects) rely on the technical reports and as such carries across the limitations and assumptions made in the respective technical reports.</p>
<p>Section 4: Appraisal, Assessment and the identification of impacts</p>	
<p>4.1 Any positive impacts or opportunities to maximise health and wellbeing outcomes are identified and how they were identified is presented clearly.</p>	<p>While there are positive impacts associated with the creation of employment from the Development, these have been scoped out of the assessment of the basis that they are unlikely to have any material beneficial impact on health and/or wellbeing.</p>
<p>4.2 Any negative impacts, gaps or unintended consequences are identified and how they were identified is presented clearly.</p>	<p>The HIA is proportionate to the project, with all credible health determinants considered and supported with an appropriate evidence base. What was not included is the added value of local energy generation and security or the potential heat use both within the port and in communities.</p>
<p>4.3 There is a balanced approach to the understanding and reporting of impacts</p>	<p>Section 6 (Assessment of Construction Effects) and Section 7 (Assessment of Operation Effects) of the HIA conduct a balanced assessment of the phases of the development.</p>
<p>4.4 Possible cumulative impacts of related policies or projects in the vicinity are considered.</p>	<p>Section 9 of the HIA provides an assessment of cumulative impacts.</p>

Criteria	Comments
4.5 All sources of evidence are triangulated and used to inform the assessment and identifications of impacts.	The HIA applies a range of overlapping evidence to underpin and support the assessment.
4.6 It is made clear how each impact identified is supported by the evidence gathered.	Each sub-section of Section 6 (Assessment of Construction Effects) and Section 7 (Assessment of Operation Effects) provides a description of the evidence underpinning the assessment.
4.7 It is clear who will be impacted and any potential inequalities in the distribution of impacts are identified.	Table 2 provides a summary of the scoping exercise results which highlights the distribution of impact along with the duration. Within the assessment, the most sensitive receptors highlighted were residents of the surrounding area.
4.8 The degree of likelihood and severity of specific impacts is distinguished	The HIA outputs are applied to inform the significance criteria within the Population and Health ES chapter. The severity of any health effect, or lack of, has been assessed and communicated for each relevant health determinant.
4.9 Has the scope of the HIA been fulfilled?	Yes.
4.10 A summary of the appraisal/ assessment is provided.	Within Section 6 (Assessment of Construction Effects) and Section 7 (Assessment of Operation Effects), conclusions associated with changes in noise exposure, transport nature and flow rate and air quality have been provided. Additionally, an overall conclusion for the HIA is presented in Section 10.
Section 5: Recommendations, Conclusions and Monitoring	
5.1 There is a clear link between the evidence gathered, assessment and recommendations.	The HIA follows a tiered process, where each stage informs and justifies the following. The HIA is proportionate, robust and evidence led.
5.2 There should be an explanation of how the findings will be used to inform the decision making processes within the project/ programme.	The HIA is an appendix to the ES chapter, intended to inform the regulatory planning process.
5.3 Recommendations should: <ul style="list-style-type: none"> ▪ Be specific, measurable, appropriate, realistic and time bound ▪ Be clearly linked to the impacts identified ▪ Prevent or mitigate potential negative impacts or unintended consequences. ▪ Maximise the benefits and opportunities of positive impacts. ▪ Be clear on who is expected to take action 	<p>Actions, mitigation and monitoring have not been identified through the HIA, where all credible health determinants have been found to comply with objective thresholds set to be protective of the environment and health; a permit to operate has been granted, demonstrating no measurable risk to the environment and/or health; and all monitoring proposed focusses on precursors to any tangible health outcome (enabling intervention before any manifest health outcome).</p> <p>Ongoing engagement has been recommended to disseminate the findings and align with any local community support initiatives, but this is already in place.</p>
5.4 If recommendations are prioritised the rationale for this should be clearly stated	
5.5 Best practice: a process is in place for monitoring the implementation of	

Criteria	Comments
<p>recommendations and indicators have been identified to monitor key health and wellbeing impacts</p>	
<p>5.6 Plans for dissemination of the report and communication of findings are specified.</p>	<p>Ongoing engagement has been recommended to disseminate the findings and align with any local community support initiatives, but this is already in place.</p>
<p>5.7 The intended audience for the report is clear and the language, information and tone of the report are suitable for this audience.</p>	<p>The HIA is provided in addition to the ES, and intended to improve transparency. Additionally, a non-technical summary of the Population and Human Health ES chapter as part of the larger ES submission has been included.</p>
<p>5.8 The structure of the report is clear and there are relevant and logical sections.</p>	<p>The structure of the HIA is logical in nature.</p>
<p>5.9 All appendices or additional documents containing data, evidence, records and details of methodology are signposted / cross referenced and easy to locate and access.</p>	<p>All supporting appendices and documents have been cross-referenced so that the HIA is as transparent as possible and any relevant information and data is easy to locate.</p>
<p>5.10 All sources are clearly and accurately referenced.</p>	<p>All sources are clearly and accurately referenced in Section 11 (References).</p>
<p>5.11 Any technical terms used in the HIA are explained in the document or a glossary.</p>	<p>All technical terms have been explained in the document, as appropriate.</p>
<p>5.12 Best practice: An executive summary or non-technical summary is provided summarising the key messages, recommendations and the supporting evidence.</p>	<p>A non-technical summary of the Population and Human Health ES chapter as part of the larger ES submission has been included.</p>
<p>5.13 Additional criteria for capital/construction/development type projects:</p> <ul style="list-style-type: none"> ▪ Is there a proposed plan for monitoring the implementation of the recommendations and a clear line of accountability for reporting ongoing outcomes? ▪ This could include: ▪ Identifying indicators for the ongoing measurement of health and wellbeing impacts. i.e emissions and noise levels ▪ A Health Management Plan 	<p>Actions, mitigation and monitoring have not been identified through the HIA, where all credible health determinants have been found to comply with objective thresholds set to be protective of the environment and health; a permit to operate has been granted, demonstrating no significant risk to the environment and/or health; and all monitoring is set on precursors to any tangible health outcome (enabling intervention before any manifest health outcome).</p> <p>Ongoing engagement has been recommended to disseminate the findings and align with any local community support initiatives, but this is already in place.</p>

Criteria	Comments
Section 6: Principles and Governance: Has it been conducted in a way that meets the principles and values of HIA?	
6.1 Equity: A focus on contributing to achieving equity and reducing inequalities is considered throughout the HIA	The HIA embeds the principles of equity within the assessment, and has considered any disproportionate risk the most sensitive members of our society.
6.2 Transparent & open: The governance of the HIA is clear and appropriate to ensure that the HIA was carried out in an effective and balanced way.	The HIA follows best practice guidance, whereby the assessment has been conducted in a transparent and open manner.
6.3 Democratic: This emphasises the rights of people to participate in major decisions that affect their lives. The stakeholders engaged reflect the diversity of all those who are likely to be affected by the proposal, involved in the development of the proposal or involved in the implementation of the proposal.	The HIA builds on previous engagement, and has tested the scope and focus of the assessment with PHW.
6.4 Sustainable: The HIA set out to maximise health and wellbeing benefits/impacts and minimise unintended consequences by considering both short and long-term impacts	Where appropriate, the short and long-term impacts are addressed in Section 6 (Assessment of Construction Effects) and Section 7 (Assessment of Operation Effects) of the HIA.
6.5 Participatory: The HIA used appropriate, effective and accessible methods of engagement for the stakeholders who were relevant for this assessment.	The HIA builds on previous engagement that led to the original planning consent.

References

Wales Health Impact Assessment Support Unit (n.d.). *Guidance and Tools*. Available at: <https://phwhocc.co.uk/whiasu/resources/> (Last accessed: April 2022).